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Consumer Acceptance and Rejection Regarding Sustainable Wine Packaging

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The wine sector is facing a major challenge in wine packaging. The environmental impact of packaging, one of the most CO_2-emitting aspects of the wine industry, needs to be addressed. In this study, we investigate how open Hungarian consumers are to buying wine in non-traditional packaging. We showed images of several alternative packaging options to a sample of domestic consumers: 1) a domestic wine bag-in-box and 2) a pouch package and (3 & 4) their internationalized equivalents. We then presented participants with a questionnaire. The questionnaire asked about the following topics: Traditionality, Familiarity, Purchase Intention (PI), Product Appeal, Taste Expectations, and Uniqueness, with participant demographic questions also included. Cluster analysis was conducted for both Hungarian packaging (HP) and International wine packaging (IP) options, suggesting that different consumer groups have different attitudes toward alternative wine packaging options. Overall, consumers are slightly more accepting of Hungarian-packaged wines on average, but at the cluster level, if only those consumers most likely to accept (and purchase) alternative packaging are considered, acceptance is greater for IP wines. Generation Z wine consumers, who are self-reported to be knowledgeable about wine and have above-average incomes, were the most likely to accept international and Hungarian alternative packaging options. The innovators' cluster group demonstrated the highest intention/willingness to purchase wine in alternative packaging of either the Hungarian or international sort. The mean value of Innovator IP is 4.84 for bag-in-box and 5.01 for pouches, making this group *more* accepting of pouches than bag-in-box packaging—an inversion of the preference of most other groups investigated. For both bag-in-box and pouch, the mean for the Innovator HP cluster is 5.17. For both Hungarian and international packaging options, it is clear that acceptance is lower for pouches (PI: 3.27; 3.47) than for bag-in-box (PI: 3.62; 3.88). We offer our results to decision-makers so that they may better understand the preferences of the Hungarian wine market and work to improve acceptance of non-traditional packaging options through consumer education and familiarization.

1. Introduction

The wine industry is increasingly focused on improving the sustainability of both wine production and packaging (Thompson-Witrick et al., 2021). Market stakeholders now see the need to take into account the impact of their decisions on the environment, society, and the economy. However, these competing concerns can be difficult to balance because some choices may help the economy but harm people or the environment (or vice versa) (Stanco and Lerro, 2020). Life cycle assessment (LCA) is becoming increasingly popular to help industry decision-makers evaluate their production and distribution chains, and LCA analyses of alternative wine packaging have been conducted by researchers in several cases, showing that single-use wine packaging is the least environmentally friendly option (Ponstein et al., 2019). For a 0.75 L bottle of wine, approximately 45.8 % of the carbon footprint impact originates from the grape growing stage and 41.1 % from the bottling and packaging stages (Ferrara and De Feo, 2018). Wines in alternative packaging are more sustainable from a CO_2-output perspective than wines packaged in single-use bottles (Csiba-Herczeg et al., 2023). Additionally, the LCA results of Stramarkou et al. (2021) suggest that Tetra Pak juice packaging is a more sustainable option than PET bottles. However, those deciding what packaging to use should not ignore the recyclability properties of each option, which should also be included in LCA analyses and might change the balance of desirability. To

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investigate consumer attitudes towards alternative packaging, researchers have often used questionnaire surveys or experiments. Chrysochou et al. (2012) measured consumer preferences for cask wine to identify the consumer profile of cask wine. The study was conducted using a web-based survey, which revealed that price, quality, and convenient packaging were the most important aspects for consumers. A survey on more sustainable packaging alternatives found that 91 % of respondents would prefer to buy wine in glass packaging only, but 62 % are inclined to reassess their purchase preferences in regards to more sustainable packaging. Consumer education about sustainable alternatives is an important factor, as consumers tend to associate alternative packaging with poorer wine quality (or believe that it leads to poorer wine quality). However, if they were shown that the quality of the wine is unaffected by (and unrelated to) packaging, the propensity to buy would be higher (Ferrara et al., 2020). Orlowski et al. (2022) conducted a 5-study experiment on consumer acceptance of alternative wine packaging for can packaging. The results show that wine packaging has a strong impact on WTP (Willingness-to-pay) through taste perception and product attractiveness. Nesselhauf et al. (2017) conducted an online experiment on a sample of 427 German consumers to investigate consumers' perceptions of innovative packaging (screw-cap bottles, bag-in-box, and StackTek®). Results showed that low-involved consumers responded positively to information about the benefits of new packaging, but high-involved consumers did not—suggesting that ingrained biases in involved (if not necessarily well-informed) wine consumers may play a role in their perception of the effects of packaging. Ruggeri et al. (2022) investigated attitudes and preferences towards alternative packaging for canned wine in Italy. A majority of the participants in the study stated that they would not be willing to buy canned wine, with the main reason given being the low quality associated with the packaging. In addition to packaging, many other factors can influence the purchase decision process, including price, label, type of closure, and other less obvious factors (Ruggeri et al., 2022). The reasons for consumers' resistance to alternative packaging may be rooted in their habits, beliefs, and preferences rather than objective differences in wine quality (Ruggeri et al., 2022).
In the present study, we investigate consumer acceptance of alternative wine packaging (bag-in-box, pouch), for which knowledge of existing research and literature is essential and forms the basis of this investigation. The studies reviewed generally used online questionnaires and experiments as research methodologies, but none of these articles used cluster analysis. The present research methodology was an online questionnaire survey, which was examined using cluster analysis, and this—the use of cluster analysis to evaluate the data in terms of attitudes toward alternative wine packaging—is what makes the present research novel.

2. Materials and Methods

This study was conducted to assess the attitudes of Hungarian consumers towards alternative wine packaging (bag-in-box, pouch). To investigate these attitudes, online questionnaires were administered to participants. Two versions of the online questionnaire were developed and deployed for the survey, one using pictures of Hungarian wines in alternative packaging and the other using pictures of international wines (Argentinian, Malbec). Before starting the survey, it was assumed that Hungarian respondents would have different perceptions of alternative packaging of Hungarian and international wines. Both versions of the questionnaire asked about the following topics: Traditionality, Familiarity, Purchase Intention, Product Appeal, Taste expectations, Uniqueness, and the demographic characteristics of the participant. Scales were adopted from a study by Orlowski et al. (2022). The two versions of the questionnaire were completed by different respondents, and the validated questions used were the same (using a 6-point Likert-type scale), with only the products pictured differing.

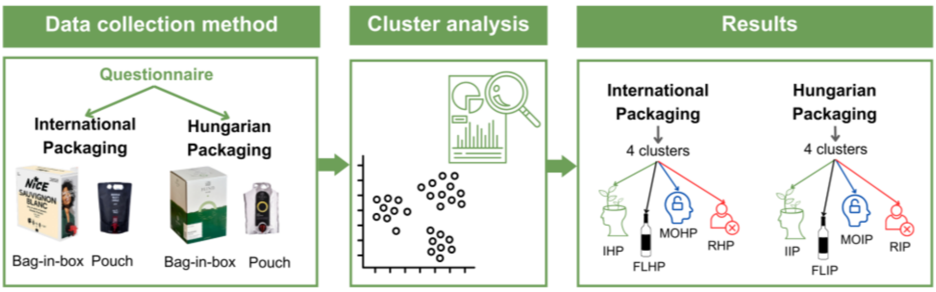


Figure 1: Research methodology

In the questionnaire, the respondents were asked whether they drink wine and how well-informed they are about wine. The questionnaire then presented questions over four themes: participant attitudes towards tradition, willingness to buy wine, product presentation, and taste expectations. All four themes were also examined in relation to bag-in-box and pouch options. The Hungarian questionnaire (HP) was completed by 173 participants, and the international questionnaire (IP) by 164 participants, for a total of 337 answers. Cluster analysis was performed using JUMP software, where each cluster was cross-tabulated and assessed using K-mean clustering.

3. Results

3.1 Sampling distribution

The demographic data of the respondents are presented in Table 1. It can be observed that there are no significant differences in demographic data between the two samples. The majority of the respondents are wine consumers, with a clear majority belonging to Generation Z. Gender distribution was roughly equal. Most respondents reported having completed *at least* high school, and most considered their incomes to be average.

Table 1: Demography data of IP and HP

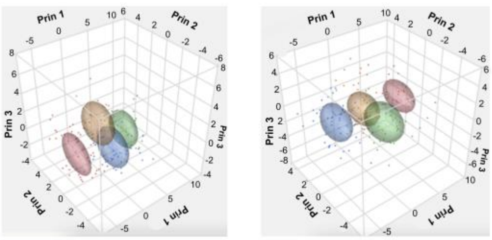
IP	Demography	HP
	Wine consumption	
82.32%	Yes	76.88 %
17.68%	No	23.12 %
	Gender	
60.37%	Male	49.13 %
39.63%	Female	50.87 %
	Generation	
3.66%	X	8.67 %
12.80%	Y	10.40 %
83.54%	Z	80.93 %
	Education	
0.00%	Primary school	2.89 %
67.07%	High school	71.68 %
31.71%	Bsc/Msc	23.70 %
1.22%	PhD	1.73 %
	Financial status	
2.44%	Much below average	4.05 %
6.10%	Below average	10.98 %
69.51%	Average	64.16 %
20.12%	Above average	19.08 %
1.83%	Much above average	1.73 %

Table 2: Attitude of IP and HP

IP	Attitude	HP
3.12	Familiarity	2.91
3.12	∑ Bag-in-box	3.35
2.40	TR	3.02
3.42	PI	3.64
3.06	PA	3.06
3.26	TE	3.62
2.92	∑ Pouch	2.94
2.27	TR	2.37
3.18	PI	3.19
2.79	PA	2.71
3.15	TE	3.24

3.2 Demographic characteristics of cluster groups

Table 2 shows the overall averages of respondents' perceptions of Hungarian and International packaged wines. In the dimensions studied, taking both samples into account, bag-in-box packaging (across Traditionality, Familiarity, Purchase intention, Product Appeal, and Taste Expectations domains) was rated better by respondents than pouch packaging. For both Hungarian and international alternative packaging wines, 4-4 clusters were identified, Figure 2 (a) shows the international packaging clusters (red – FLIP; blue – RIP; green – IIP; brown – MOIP) and (b) the Hungarian packaging clusters (red – IHP; blue – RHP; green – MOHP; brown – FLHP).



(a) (b)

Figure 2: Clusters IP (a) and clusters HP (b)

The demographic data of the cluster groups for both samples are detailed in Table 3. It can be observed that for both samples, there is one cluster group that identifies itself as a wine consumer (IIP, IHP). In terms of gender, clusters are evenly distributed. Regarding their generational classification, the majority of the respondents in both samples belong to Generation Z, and thus, Generation Z encompasses the majority of cluster groups. In terms of educational background, the cluster groups in both samples show similarities, with a predominance of high school graduates and university graduates. In terms of income, they describe themselves as average. Overall, both samples have similar demographic characteristics, and the differences between the cluster groups will be discussed later in the presentation of the cluster groups.

Table 3: Demographic characteristics of cluster groups

IP				Demography	HP			
IIP (n=28)	FLIP (n=47)	MOIP (n=59)	RIP (n=30)		RHP (n=50)	MOHP (n=60)	FLHP (n=39)	IHP (n=24)
				Wine consumption				
92.86 %	76.60 %	81.36 %	83.33 %	Yes	66.00 %	75.00 %	79.49 %	100.00 %
7.14 %	23.40 %	18.64 %	16.67 %	No	34.00 %	25.00 %	20.51 %	0.00 %
				Gender				
50.00 %	61.70 %	66.10 %	56.67 %	Male	44.00 %	51.67 %	53.85 %	45.83 %
50.00 %	38.30 %	33.90 %	43.33 %	Female	56.00 %	48.33 %	46.15 %	54.17 %
				Generation				
0.00 %	10.64 %	1.69 %	0.00 %	X	14.00 %	5.00 %	5.13 %	12.50 %
14.29 %	8.51 %	18.64 %	6.67 %	Y	14.00 %	5.00 %	12.82 %	12.50 %
85.71 %	80.85 %	79.66 %	93.33 %	Z	72,00 %	90.00 %	82.05 %	75.00 %
				Education				
0.00 %	0.00 %	0.00 %	0.00 %	Primary school	2.00 %	1.67 %	7.69 %	4.17 %
60.71 %	70.21 %	67.80 %	66.67 %	High school	70.00 %	68.33 %	79.49 %	70.83 %
39.29 %	29.79 %	28.81 %	33.33 %	Bsc/Msc	28.00 %	30.00 %	10.26 %	20.83 %
0.00 %	0.00 %	3.39 %	0.00 %	PhD	0.00 %	0.00 %	2.56 %	4.17 %
				Financial status				
7.14 %	2.13 %	1.69 %	0.00 %	Much below average	6.00 %	5.00 %	0.00 %	4.17 %
0.00 %	4.26 %	10.17 %	6.67 %	Below average	10.00 %	8.33 %	20.51 %	4.17 %
67.86 %	68.09 %	74.58 %	63.33 %	Average	72.00 %	63.33 %	66.67 %	45.83 %
21.43 %	25.53 %	10.17 %	30.00 %	Above average	12.00 %	21.67 %	12.82 %	37.50 %
3.57 %	0.00 %	3.39 %	0.00 %	Much above average	8.33 %	0.00 %	1.67 %	0.00 %

3.3 Cluster groups' attitudes towards alternative wine packaging

For the comparative analysis of cluster groups, an average value was used. For international packaging (IP), four clusters were identified: Innovator IP (IIP), Folklore Lovers IP (FLIP), Moderately Open-minded IP (MOIP), and Rejectionist IP (RIP). The IIP group—as its name implies—is the most informed about wine (3.50), and the most accepting of alternative packaging, and thus may be considered the most likely to buy wine packaged in alternative containers. Members of this group are also the most open to pouch packaging (4.68), most likely to buy wines in pouches (5.01), and most likely to have high taste expectations for wine in pouches (4.77). Members of the FLIP cluster group are less knowledgeable about wines (3.36) than IIP. Members of the FLIP cluster group do not accept international wines in alternative packaging at all and have negative attitudes towards bag-in-box (1.99) and pouch options (1.83). Three-quarters of them are wine drinkers (76.69 %), and they tend to be male (61.70 %), and members of Generation Z (80.85 %), but a non-negligible proportion of them are members of Generation X (10.64 %). Most have a high school diploma (70.21 %), and their income status is similar to IIP. The MOIP cluster group has a medium level of acceptance of alternative packaged wines. They also have medium attitudes towards bag-in-box (3.34) and pouch (3.35) packaging, with both packaging options being perceived to deviate from tradition. The cluster is mostly made up of Generation Z, but out of the clusters, the MOIP has the highest proportion of Generation Y (18.64 %), middle-income earners, high school graduates (67.80 %,) and doctorate holders (3.39 %). The RIP cluster also shows a similar pattern for bag-in-box packaging, but they are much more resistant to Pouch (2.15). An interesting finding is that they have the highest proportion of Generation Z, so this younger consumer group would be expected to show the highest acceptance of alternative wine packaging.

Table 4: Attitudes of cluster groups in the dimensions studied (Mean)

		IP		Clusters			HP	
IIP	FLIP	MOIP	RIP	Category	RHP	MOHP	FLHP	IHP
3.50	3.36	2.92	2.80	Familiarity	2.58	2.95	2.97	3.42
4.22	1.99	3.34	3.44	∑ Bag-in-box	2.43	3.40	3.65	4.67
3.32	1.87	2.63	1.90	TR	2.58	3.37	2.90	3.42
4.84	1.96	3.58	4.08	PI	2.49	3.58	4.29	5.17
4.24	1.51	3.39	3.73	PA	1.98	3.13	3.12	5.04
4.21	2.13	3.57	3.54	TE	2.71	3.58	4.06	4.88
4.68	1.83	3.35	2.15	∑ Pouch	1.59	3.23	3.17	4.68
3.71	1.61	2.38	1.75	TR	1.39	2.84	2.15	3.56
5.01	1.89	3.69	2.48	PI	1.63	3.37	3.70	5.17
4.77	1.60	3.33	1.74	PA	1.37	3.10	2.56	4.75
4.77	2.13	3.58	2.38	TE	1.91	3.43	3.75	4.69

Respondents who evaluated Hungarian wine packaging (HP) can also be divided into four cluster groups, and their naming is similar to the International packaged wines cluster groups. The IHP cluster group also accepts bag-in-box (4.67) and pouch packaging (4.68) but to a lower extent than IIP. This cluster group consists entirely of wine consumers (100.00 %), with average income and education. Concerning familiarity, the FLHP cluster group shows a significant decrease compared to IHP (2.97), and they somewhat accept bag-in-box packaging (3.65) but also criticize its lack of traditional features (2.90) and its appearance (3.12), and have similar opinions about pouch packaging (3.17). They would prefer to buy a bag-in-box wine (4.27) rather than a pouch wine (3.70). MOHP cluster group members are similar in terms of familiarity (2.98) to FLHP (2.97). MOHP attitudes are worse in terms of familiarity with bag-in-box (3.40) and better in terms of familiarity with pouch (3.23) compared to FLHP (3.17). The most noteworthy difference between FLHP and MOHP is that they prefer a different alternative packaging. The RHP cluster group has the lowest familiarity with non-traditional/alternative packaging (2.58), does not accept alternative packaging, and shows the highest resistance to pouches (1.59) of all cluster groups. More than a third of the cluster group members do not consume wine (34.00 %), and the group has a significant internal income disparity, with 8.33 % having "much above average" income and 6.00 % having "much below average" incomes. Persuading the members of this group to accept alternative packaging is likely to be very difficult, time-consuming, and costly. Further in-depth interview research could be conducted to find out why this group's resistance to alternative packaging is unusually strong and how and in what ways this could be changed and influenced. Overall, it was found that the respondents were less accepting of alternative Hungarian packaged wines. Thus, a xenocentric consumer attitude was observed among the respondents. They are more accepting of international alternative packaged wine than Hungarian ones.

4. Discussion and Conclusion

The present study's primary innovation lies in its application of cluster analysis to categorize consumer attitudes toward alternative wine packaging, shedding light on distinct consumer segment behavior and preferences. Furthermore, the study's comparative analysis between Hungarian and international packaging preferences reveals valuable insights into potential regional/cultural variations in consumer preferences, offering a novel perspective on the impact of sustainability trends in the wine industry. Overall, respondents were found to be more open to international alternative packaged wines than Hungarian wines. The purchase intention of the innovators' cluster groups is the highest for both Hungarian and foreign packaging. The mean value of the IHP cluster group is 4.84 for bag-in-box and 5.01 for pouch. For both bag-in-box (BiB) and pouch, the mean for the IHP cluster is 5.17. For both bag-in-box and pouch, the RHP and FLIP cluster groups are the most inclined to reject new packaging options. Purchase intention for the RHP is 2.49 for the BiB, 1.63 for the pouch, and 1.96 and 1.89 for the FLIP cluster group, respectively. Cluster group IIP, who are the most open to pouches, are likely to be wine drinkers and members of Generation Z. This group also demonstrates the highest average level of education (with 39.29 % having completed college) and has a substantial number of affluent members (with 21.43 % reporting above-average incomes). The IIP group is the most likely to accept alternative packaging. In contrast, members of the FLIP bar group do not accept international wines in alternative packaging at all and have a negative attitude towards bag-in-box and pouches. Three-quarters of them are wine drinkers, and many are male and members of Generation Z, but the group has the highest proportion of Generation X and high school graduates of any group. Despite these differences, its income levels are similar to those of IIP. Both MOIP and RIP are equally accepting of bag-in-box, but RIP does not accept pouches. At the beginning of our research, we assumed that since RIP had the highest proportion of Gen Z in the cluster group, they would be the most open to alternative packaging, but this was not the case. Rather, openness is influenced by whether

a person consumes wine. Well-informed wine consumers are the group most likely to accept alternative packaging. The IHP group also accepts bag-in-box and pouch packaging but to a lesser extent than IIP. Hungarian consumers are more likely to take international wines in non-traditional packaging off the shelf than similarly packaged Hungarian wines. Overall, MOHP attitudes are worse towards bag-in-box and better towards pouch than FLHP. The fundamental difference between FLHP and MOHP is that each prefers a different alternative packaging.
Overall, the cluster group patterns for both international and Hungarian packaged wines show that barely a quarter of respondents are open to alternative packaging, preferring to stick to traditional bottles. Thus, in the case of sustainably packaged wines, only a small proportion of the sample is willing to accept a change from the status quo. That said, these conclusions were drawn from a relatively small sample, focusing on Generation Z (which we assumed would be more open-minded than older generations). We recommend that further research with larger sample sizes be conducted using the methodology presented herein. We also recommend that qualitative research be conducted to gain more insight into the thoughts and perceptions of Hungarian consumers.

Nomenclature

FA – Familiarity
TR – Traditionality
PI – Purchase Intention
PA – Product Appeal
TE – Taste expectations
IP – International Packaging
HP – Hungarian Packaging
IIP – Innovator IP
n – number
IHP – Innovator HP
FLIP – Folklore Lovers IP
FLHP – Folklore Lovers HP
MOIP – Moderately Open-minded IP
MOHP – Moderately Open-minded HP
RIP – Rejectionist IP
RHP – Rejectionist HP

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